STATUS OF REVISIONS TO ASHRAE STANDARD 62

F.M. Gallo, PE, CFM, CIAQP Senior Vice President LZA Technology Dallas, TX
Member ASHRAE SSPC 62

ABSTRACT

The American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 62-1989 "Ventilation for Acceptable Indoor air Quality", adopted in 1989, is widely used by HVAC engineers to determine ventilation rates for various occupancies. This standard has also been cited in court to help demonstrate compliance with state-of-the-art indoor environmental design.

In August 1996, ASHRAE released for public review Standard 62-1989R, the highly controversial proposed revisions to the Standard 62-1989.

Over 8,000 comments were received on the proposed revision. Due to the significant number of concerns expressed by ASHRAE members as well as others, ASHRAE withdrew the proposed new standard and placed the current standard in "continuous maintenance."

As part of the continuous maintenance process ASHRAE is transforming the current Standard 62-

INTRODUCTION

Indoor air quality (IAQ) is one of the major issues of concern for building and facility managers as we approach the 21st century. The Building Owners and Managers Association (BOMA) states: "As the health, safety, and comfort of office occupants are our highest priority, indoor air quality is a continuing concern to real estate professionals (1)."

A 1997 study on workplace complaints by the International Facility Management Association (IFMA) ranked IAQ among the top 10 complaints heard by facility managers (2). IFMA believes that the work environment has a significant impact on people, productivity, and ultimately the achievement of organizational goals. IAQ can have a significant impact on productivity totaling as much as $60 billion annually (3). The federal government has done extensive research into the health and financial impacts of poor IAQ. OSHA says that poor IAQ represents a significant material health impairment to employees (4).

produced—one for low-rise residential buildings and another for other types of occupancy.

Finally, two new documents, a user's manual and an IAQ guideline, will be written concurrent with the code documents. The guideline document is intended to provide state-of-the-art guidance to designers while good IAQ practices not appropriate for codification will be incorporated into the guideline.

It is likely that many of the provision in Standard 62-1989R will survive in some manner in one or more of the new documents to be produced.

This paper will detail some of the more significant changes that were proposed in Standard 62-1989R and review the current state of standard development.

30% of the non-industrial buildings in the US have IAQ problems (5). OSHA further estimates that the productivity losses due to poor IAQ in these buildings cost the US economy $15 billion dollars annually. The Building Air Quality Alliance states that poor IAQ can cost employers between $4 and $6 per square foot in lost productivity (6). This figure is far in excess of the average energy or maintenance budget.

CURRENT STATE OF FEDERAL IAQ REGULATIONS

At present there is no federal law specifically regulating indoor air quality in the non-industrial workplace. While OSHA has investigated complaints of poor IAQ and has cited employers under the general duty clause, confusion remains on the part of many employers as to what they specifically are required to do to safeguard the health of their employees from poor IAQ.

This situation will change if the 1994 OSHA proposed indoor air quality rule becomes law. This proposed regulation would require most employers in the US to develop written IAQ plans. The proposed rule focused primarily on ventilation, operations and maintenance. OSHA received over 115,000 comments on the rule. The agency has identified several gaps in information and they state more analysis is required (7).

The US EPA has been very active in the IAQ field—but only from a research and education perspective. The EPA does not have regulatory powers in the workplace. However, the EPA did develop a voluntary program, "The Building Air Quality Alliance", to recognize those building owners that practice proactive IAQ management. The program was de-funded by the 104th Congress after concerns were raised by some business groups that the Alliance was a back-door effort by the EPA to regulate IAQ (8). In 1996, The University City Science Center, a non-profit consortium of 28 educational and scientific institutions in Philadelphia, created a private sector version of the Alliance and is now accepting buildings into their program (9).

The 103rd Congress came very close to passing an indoor air quality law. There were IAQ bills in both the Senate and the House. The 104th Congress had only one IAQ bill in the House—HR 933, sponsored by Representative Joseph Kennedy (D-Mass) and none in the Senate. Rep. Kennedy recently proposed a similar bill but it is stuck in committee where it will likely remain for the term of the 105th Congress (10).

ASHRAE STANDARD 62-1989

While there is no federal IAQ rule or legislation, there is one IAQ standard that does have national impact, namely ASHRAE's Standard 62-1989 (11). This standard has been widely referenced by building codes throughout the US. It is used primarily by design professionals to determine the minimum quality and quantity of outdoor air used to ventilate indoor spaces. This standard has also been cited in court to help demonstrate compliance with state-of-the-art indoor environmental design (12).

The current standard was issued in 1989. An addendum to the standard was issued in 1990 to incorporate ANSI concerns over the wording of the Purpose Statement.

The 1989 edition stated that the purpose of the standard was "To specify minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to avoid adverse health effects." The 1990 addendum changed the wording to read: "To specify minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to *minimize the potential for* adverse health effects." This addendum addressed the concerns that the original wording implied that adherence to the standard would be sufficient to avoid all adverse health effects. Adequate ventilation alone cannot guarantee that any one individual will not suffer adverse health effects.

The standard states that acceptable indoor air quality can be achieved by two alternate methods. The first and by far the most commonly used method is the so-called "ventilation rate procedure". This procedure prescribes ventilation rates of a specified quality and quantity to a space, which ranges between 15 and 60 cubic feet per minute (CFM) per person. For example, the standard specifies that the outdoor air requirement for office space is 20 CFM per person.

Acceptable IAQ can also be achieved by the "Indoor Air Quality Procedure" which employs controlling known and specified contaminants. For example, the IAQ procedures' guideline for carbon dioxide (CO_2) is 1,000 parts per million (ppm). This level of CO_2 is not based on a health risk but as a surrogate for human comfort (odor). The indoor air quality procedure is rarely used because of air cleaning requirements and the necessity for air quality monitoring to demonstrate compliance with the standard.

The existing standard's definition of acceptable indoor air quality is "air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction." The expression of dissatisfaction in reality is likely to be based on *perceived indoor air quality*. In fact, 62-89's minimum ventilation rate of 15 CFM was selected to control the perception of body odor to an 80% satisfaction rate (13). Additional ventilation above the 15 CFM baseline was added to control other sources of contaminates in the space. For example, 5 CFM was added to the 15 CFM for office occupancies to take into account contaminant sources commonly found in the office workplace.

Other details of 62-89 include:

- The allowance of a moderate amount of smoking in spaces
- A requirement to evaluate the acceptability of outdoor air that is used for ventilation
- The treatment of outdoor air where required prior to introduction into the building
- The allowance to adjust the ventilation rate for variable occupancy
- A recommendation to maintain relative humidity between 30 and 60%
- The allowance to use natural or mechanical ventilation

HIGHLIGHTS OF ASHRAE STANDARD 62-1989R

ASHRAE's ventilation standard was first issued in 1973, revised in 1981 and revised again in 1989. ASHRAE has formed a standing committee to generate periodic revisions and interpretations to Standard 62-1989. The standard had undergone proposed revision and in August 1996 these proposed revisions were issued for public comment (14).

The proposed revisions took many years to formulate and were the result of thousands of hours of effort from a committee (SSPC 62) composed of some of the world's leading experts in indoor air quality. Unlike its predecessors, the revised standard was written in code language to enable adoption directly into building codes.

The revised standard took a philosophically different approach in determining minimum ventilation rates. Ventilation rates listed in the standard were intended to satisfy adapted persons in the space. An adapted person is an individual who is in the space for more than 15 seconds. It is well known that people can adapt to odors after a brief period of time. The revised standard recognized this fact and allowed the design engineer to ventilate for adapted persons. In some occupancies this resulted in lower ventilation rates than required in the present standard (see Table 1). In other cases it specified the same or more ventilation than its predecessor did. The design engineer would have had the option to design for un-adapted individuals (visitors) by adding 10 CFM per person.

The revised standard was more health-oriented than Standard 62-1989. It placed greater emphasis on contaminant source management. Also, the new standard would have not only addressed how ventilation systems were designed but also how they were to be constructed, operated and maintained. These added requirements would have had an impact on the facility manager as much as on the design engineer.

Some of the proposed requirements and recommendations with a direct impact on designers and facility managers are listed below:

- The standard no longer purported to provide acceptable IAQ in smoking and smoke-exposed zones.
- Minimum ventilation rates were based on no smoking
- The allowance to design for either visitors or adapted persons.
- The standard would have no longer required cleaning of outdoor air where it failed to meet the National Ambient Air Quality Standards
- New classifications of return, transfer, and exhaust air into 5 categories with associated limitations on its reuse in a building
- Specification of minimum filtration efficiencies used in ventilation systems
- Requirements to add provisions to measure and adjust air flows
- Thermostats accessible and operated by occupants cannot permit intermittent fan operation (auto setting) when the fan supplies outdoor air.
- New requirements to protect the ventilation system and adjacent occupied space during construction and renovation
- Requirements to balance the ventilation system on initial system start-up
- Specification of minimum ventilation system maintenance procedures addressing filters, outdoor air dampers, plenums, coils, drain pans, and cooling towers
- New appendices covering emissions from furnishings and building materials and controlling microbial growth

Table 1 highlights the major difference between the two documents (14, 15). Virtually no section of the existing standard remained the same.

Item	Standard 62-89	Standard 62-89R
Documentation	Scant reference to documentation	Detailed documentation requirements
Outdoor air quality	Should treat outdoor air used for ventilation that fails to meet NAQQS	Outdoor air quality should be addressed on a community-wide basis
Outdoor air intakes	General guidance on location	Specific numerical guidance from various reference points
HVAC system access	No requirements for HVAC system access	Requires system design to provide access for routine maintenance
Demand controlled ventilation	Maximum 1,000 ppm CO_2	Downplays role of CO_2
Hot humid climates	Focus on drain pans and sources of stagnant water	Requires both humidity and pressurization controls where humidity is expected to be a problem
Natural Ventilation	Natural or mechanical	Restricts natural ventilation where there are unusually high indoor sources of contaminants
Determination methods of design ventilation rates	• Ventilation rate procedure • IAQ procedure	• Simple systems procedure • Prescriptive procedure • Analytical procedure
Lowest ventilation rate allowed for a specific occupancy	15 CFM/person for classrooms (ventilation rate procedure)	5.5 CFM/person for lecture hall (simple system procedure)
Construction and system start-up	No requirements	Specific requirements
Maintenance	No requirements	Specific requirements

TABLE 1

CURRENT STATUS

Over 8,000 comments were received on the proposed revision. Due to the significant number of concerns expressed by ASHRAE members as well as others, ASHRAE withdrew the proposed new standard and placed the current standard in "continuous maintenance (16)."

As stated previously, ASHRAE is transforming the current Standard 62-1989 from a design standard to two code documents—one for low-rise residential buildings and another for other types of occupancy (17).

These two new documents along with a user's manual and an IAQ guideline will undoubtedly contain many of the previously proposed changes detailed above.

The short-term focus of the SSPC 62 committee is to amend the title, purpose and scope (TSP) of the existing standard to incorporate selected portions from ASHRAE 62-1989R.The scope changes being considered include (18):

- Explicit limitation of scope to new buildings and additions to existing buildings
- Consideration of chemical, physical, and biological contaminants
- Exclusion of thermal comfort requirements
- Deletion of reference to environmental tobacco smoke in Table 2
- Clarification of role of carbon dioxide

Other short term goals include incorporating the 27 interpretations to the existing standard into addenda, development of construction and maintenance sections, codification of the standard by the year 2000, and revising Table 2, "Outdoor Air Requirements for Ventilation."

CONCLUSIONS

The proposed revisions when finally adopted in one or more of the new documents will have a significant impact on the design, operations and maintenance in most buildings. As with its predecessors, the new documents will likely assume a prominent status in the courts as a minimum standard of care in the design and operation of buildings for acceptable IAQ. Facility managers will be under greater pressure to ensure that their buildings are operated and maintained in accordance with its provisions.

REFERENCES

1. BOMA International 1998. Indoor air quality. *BOMA Website.* http://www.boma.org/iaqiss.htm
2. International Facility Management Association 1997. Results in for 1997 corporate facilities monitor, *IFMA News*, September 1997
3. Abdou OA et al 1994. The impact of the building indoor environment on occupant productivity-part 3: effects of indoor air quality. ASHRAE Technical Data Bulletin, Vol. 10, No. 4, pp. 23-33
4. Federal Register, Vol. 59, No. 65, Tuesday, April 5, 1994, *Proposed Rules*, pg. 15969
5. Federal Register, Vol. 59, No. 65, Tuesday, April 5, 1994, *Proposed Rules*, pg. 16006
6. Building Air Quality Alliance 1996. *Participants Manual*, section 3, pg 8
7. Interagency Committee on Indoor Air Quality, c/o Indoor air Division, US EPA 1997. *Highlights* October 29, 1997
8. Vogt CF 1995. EPA's alliance dead; private sector may be eying similar program, *Indoor Air Quality Update*, Vol. 8, No 8
9. Vogt CF 1996. Science center proposes hosting "reborn" alliance, *Indoor Air Quality Update*, Vol. 9, No 1
10. Vogt CF 1998. Another Kennedy indoor air bill languishes in committee, *IEQ Strategies*, Vol. 11, No 3
11. ASHRAE Standard 62-89, Ventilation for acceptable indoor air quality, American Society of Heating, Refrigerating and air-Conditioning Engineers, Inc. Atlanta, 1989
12. Diamond M 1997. Top 12 tips to help you avoid getting sued for IEQ problems, *IEQ Strategies' Managing Risk* June 1997
13. Tucker, WG 1993. Status of ASHRAE standard 92 – ventilation for acceptable indoor air quality, *Proceedings of Indoor Air `93*, Vol. 3, pg 525
14. ASHRAE Standard 62-1989R, Ventilation for acceptable indoor air quality public review draft, American Society of Heating, Refrigerating and air-Conditioning Engineers, Inc. Atlanta, 1996
15. Vogt CF 1998. IAQU previews ASHRAE's revised standard 62, *Indoor Air Quality Update*, Vol. 9, No 8
16. Vogt CF 1997. Standard 62 revision in turmoil as ASHRAE changes process, *IEQ Strategies*, Vol. 10, No 8
17. ASHRAE 1998. New ways to revise standards, *ASHRAE Journal*, Vol. 40, No. 3, pp 11-17
18. BSR/ASHRAE Addenda 62b, 62c, 62d, 62e, and 62f, Addenda to ANSI/ASHRAE 62-1989, American Society of Heating, Refrigerating and air-Conditioning Engineers, Inc. Atlanta, 1998